TE278
.S53
1977
DISPLAY COPY
DO NOT REMOVE

OKLAHOMA DEPARTMENT OF TRANSPORTATION
5 6208 10012 2250

AN EXPERIMENTAL PRODUCT EVALUATION

PORTLAND CEMENT CONCRETE CONTRACTION JOINT SEALERS

by

Research Div.
Library

Mitchell D. Smith
Product Evaluation Engineer

RESEARCH AND DEVELOPMENT DIVISION
OKLAHOMA DEPARTMENT OF TRANSPORTATION
200 N.E. 21st Street
Oklahoma City, OKlahoma

C. Dwight Hixon
Research and Development Engineer

Prepared in Corporation with the
U. S. Department of Transportation's Federal Highway Administration

The opinions, findings, and conclusions expressed in this publication are those of the author and not necessarily those of the Federal Highway Administration.

TE278
.S53
1977
OKDOT
Library

A

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
73-06-1		

4. Title and Subtitle	5. Report Date
An Experimental Product Evaluation Portland Cement Concrete Contraction Joint Sealers	12-77
	6. Performing Organization Code 2707
7. Author(s) Mitchell D. Smith, Product Evaluation Engineer	8. Performing Organization Report No. 73-06-1
9. Performing Organization Name and Address Oklahoma Department of Transportation 200 N.E. 21st Street Oklahoma City, Oklahoma	10. Work Unit No.
	11. Contract or Grant No. 73-06-1
	13. Type of Report and Period Covered Type B 11-73 to 12-77
12. Sponsoring Agency Name and Address Federal Highway Administration 200 NW Fifth, Room 454 Oklahoma City, Oklahoma	14. Sponsoring Agency Code

15. Supplementary Notes

Done in cooperation with the Federal Highway Administration

16. Abstract

A final report by ODOT pertaining to the evaluation of Portland Cement Contraction Joint Sealers. The method of evaluation is described. These sealers were evaluated for their performance in sawed P.C. Concrete Joints. The results of the evaluation, conclusions, and recommendations are included in the report.

17. Key Words	18. Distribution Statement
Joint Sealers Crack Sealers	No restrictions

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
None	None	6	

Form DOT F 1700.7 (8-69)

INTRODUCTION

During this study which was initiated in 1973, two types of joint sealers were evaluated. These sealers were placed in the sawed joints of P.C. concrete pavements and evaluated for their performance over a period of time. This report includes the results of their performance.

Evaluation of Polymer Type, Two Component Cold Applied, Machine Extruded and Pourable Sealers.

A Polymer Type, Two Component Cold Applied, Machine Extruded and Pourable Joint Sealer was placed in joints of newly constructed PC Concrete pavement as an experimental sealer manufactured by Polyguard Pipeline Products, Incorporated, Pryor, Oklahoma. The sealer was placed in approximately 25 sawed joints of new PC Concrete paving. The location of the evaluation site is located on I-240 and Southwest 29th Street in Oklahoma City. The sealer has been in service for approximately two years and has performed in an excellent manner. It demonstrated excellent adhesive and resilient characteristics. The sealer meets Federal Specifications SS-S-200D but does not meet ODOT Specification 701.08(e)-1(a) for Polymer Type, Two Component Cold Applied Machine Extruded and Pourable Joint Sealer.

Another of this type sealer has been under performance evaluation. Allied #9809 Polymer Type, Two Component Cold Applied, Machine Extruded and Pourable Joint Sealer also demonstrated excellent adhesion and resilient characteristics. This sealer also meets Federal Specification SS-S-200D. The location of the evaluation site is in Tulsa Oklahoma, on S.H. 266. This sealer has been under evaluation for approximately three years.

Evaluation of Hot Pouring Sealers

Two variations of the Hot Pour Type Joint Sealers were evaluated during this study. Both of these sealers were manufactured by W. R. Meadows, Incorporated.

During November 1973, the manufacturer poured approximately eighty sawed joints of PC Concrete pavement where the joints needed repouring. The sawed joints were cleaned with a router type device behind a tractor, sand blasted, and blown clean prior to pouring. The location of the evaluation site is in the southbound lane of I-35 and Waterloo Road in northern Oklahoma County.

Fifty of the sawed joints were poured with their material name "HI-SPEC". Thirty of the sawed joints were poured with their material named "POLY JET". A double bottom kettle was used to heat the materials. In this particular case, the Cimceal Matter/Applicator Kettle was used. It is manufactured by Construction Materials, Incorporated, Cedar Rapids, Iowa.

The "POLY JET" material, after application demonstrated some undesirable characteristics. The material had low adhesion and did not bond to the concrete very well. It could be pulled out of the sawed joint. It was not compatible with asphalt and would not bond with the asphalt type shoulders which were constructed along side the PC concrete pavement slab.

The "POLY JET" material was intended to be used on airport runways and it is resistant to jet fuel which might be spilled on the runway and otherwise dissolve the joint sealing material. Producing this feature of the material evidently made it incompatible with asphalt materials.

These particular characteristics make the material undesirable for highway use such as maintenance of cracks in asphalt pavement as well as sawed joints of PC Concrete.

The "HI-SPEC" material after application demonstrated that it is an excellent hot pour material that can be used for maintaining sawed joints in PC concrete pavement and for pouring cracks in asphalt pavements.

The material demonstrated excellent adhesions to the concrete, and to the asphalt paved shoulder adjacent to the concrete. This assures a good seal of the sawed joint. The material demonstrates excellent resilient characteristics. After four years, the material is very resilient and is still bonded to the concrete.

CONCLUSIONS

It was concluded that the Polymer Type, Two Component Cold Applied, Machine Extruded Joint Sealers were much more expedient in application during construction. This is because of the ability to apply the material without the heating proceedure. The quality loss of the sealer being applied is eliminated because of the absent problems of cooling down and reheating the hot pour sealer materials.

It was also concluded that several dollars can be saved by the Department if all crack pouring crews used a reliable type of hot pour joint sealer. "HI-SPEC" was found to be a very good hot pour sealer. The Cimceal Melter/Applicator Kettle was found to be good for applying hot pour sealers. It having a double bottom prevented the sealer from being over heated or burned, causing the sealer to lose its resilient and adhesive properties. A patching crew using a material equal to this sealer would not be required to return each year to pour joints, but could establish a program where it would only be necessary to pour any joint every five to seven years. Thus a program would increase efficiency and economy in this maintenance operation.

RECOMMENDATIONS

Hot Pouring Sealers

It is recommended that "POLY JET" not be used by the Department.

As a result of the performance of the "HI-SPEC" material, it is recommended to ODOT Maintenance Division for maintainance use of pouring cracks.

Polymer Type, Two Component Cold Applied, Machine Extruded and Pouring Sealers

As a result of the performance of the Polymer Type, Two Component, Cold Applied, Machine Extruded and Pourable Joint Sealers, that meet Federal Specification SS-S-200D, they were recommended to the ODOT Design Division to be used as an alternate on new construction projects. As a result of the

recommendation, joint sealers meeting Federal Specification SS-S-195B and/or SS-S-200D will be considered as an alternate to ODOT present specification for joint sealers. (See attached Special Provision)

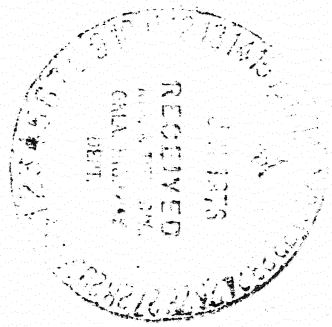
There are several of these type of sealers available and the sealers will be approved by ODOT upon certification from the manufacturer that their sealer meets Federal Specification SS-S-195B and/or SS-S-200D. The ODOT Research Division will be notified of the construction project on which these sealers will be applied. The construction projects will be monitored on a routine basis by the Research Division and the performance of these sealers will be observed. If there are any problems with the sealers performance, further research may be required.

After evaluating the performance of these sealers a special provision has been provided with a request for the Department to use sealers meeting Federal Specification SS-S-200D as an alternate to ODOT Specification Section 701.08(e)-1(a).

With this alternate, special provision, and all sealers meeting it being approved by the Department's Materials Division, this study will be terminated by the Department's Research Division.

IMPLEMENTATION

Please see attached letter and Special Provisions to Federal Highway Administration.



July 19, 1976

Mr. Gordon E. Penney, Division Engineer
Federal Highway Administration
2400 North Broadway
Oklahoma City, Oklahoma 73103

Dear Mr. Penney:

Subject: Special Provisions for Portland Cement Concrete Joint Sealers, 701.05(e)-1(a), dated 7-19-76.

Attached is a Special Provision which will permit the use of joint sealers that may not meet our 1975 Standard Specifications. Many of them have been developed and, are tested under criteria other than that we specify. If the joint sealer meets the Federal Specification, we feel it would be appropriate to use.

We plan to use this Special Provision as a trial balloon on a job-to-job basis on some rural and urban projects to see whether or not some interest develops .

We would appreciate your reviewing, commenting, and approving this Special Provision for the conditions proposed.

Sincerely yours,

John A. Ashworth, Jr., P. E.
Specifications Engineer

JAA:dt

cc: Assistant Director-Contract Administration
Office Engineer
Materials Engineer
Research Engineer
Rural Design Engineer
Urban Design Engineer

OKLAHOMA DEPARTMENT OF HIGHWAYS
SPECIAL PROVISIONS
FOR
PORTLAND CEMENT CONCRETE JOINT SEALERS

These Special Provisions revise, amend, and where in conflict, supersede applicable subsections of Section 701.08(e) Standard Specifications for Highway Construction, Edition of 1976.

701.08(e)(2). Materials. Materials meeting Federal Specifications SS-S-200 D may be used on this project. The Bond Breaker recommended by the materials manufacturer shall be used as shown on the Standard Detail Sheet LECS-1-0. A technical representative of the manufacturer shall be present on the job and shall supply detailed recommendations to the Contractor for applying the joint sealing materials. Extruding equipment shall be of a type or kind recommended by the manufacturer.

2.1. Acceptance. (Amend as follows). A Type A certification shall be furnished with each shipment or lot.